

CLAIMS

1 **1. A micro-electromechanical switch comprising:**

2 **at least one contact electrode; and**

3 **a deflecting beam, said deflecting beam contacting said at least one**
4 **contact electrode by way of a compressible deformable means affixed to at**
5 **least one end of said deflecting beam or to at least one of said contact**
6 **electrodes.**

1 **2. The micro-electromechanical switch as recited in claim 1, wherein said**
2 **compressible deformable means is selected from the group consisting of a**
3 **layer and discrete spring-like elements protruding from said at least one**
4 **contact electrode.**

1 **3. The micro-electromechanical switch as recited in claim 1 further**
2 **comprising a control electrode coplanar to said at least one contact electrode.**

1 **4. The micro-electromechanical switch as recited in claim 3, wherein the**
2 **deflection of said deflecting beam is governed by applying a voltage between**
3 **said deflecting beam and said control electrode.**

1 5. The micro-electromechanical switch as recited in claim 4, wherein the
2 voltage required to deflect said deflectable beam to close the micro-
3 electromechanical switch is dependent on k_0 , the spring constant of said
4 deflectable beam; of the distance between said deflectable beam and said
5 control electrode; and the distance between said deflectable beam and said
6 contact electrode

1 6. The micro-electromechanical switch as recited in claim 1, wherein said
2 compressible deformable means introduces a non-linear increase to a
3 separating force able to overcome stiction as the micro-electromechanical
4 switch nears its closed position.

1 7. The micro-electromechanical switch as recited in claim 1, wherein said
2 compressible deformable means is a layer affixed to said at least one contact
3 electrode, said layer being made of a material selected from the group
4 consisting of polymer matrix Parylene and anisotropic electrically conductive
5 film (ACF).

1 8. The micro-electromechanical switch as recited in claim 6 wherein said
2 separating force able to overcome stiction further depends on spring
3 constants k_1, \dots, k_n , wherein n is an integer greater than or equal to 1, said
4 separating force being sequentially added to the force dependent on k_0 , the
5 spring constant of said deflectable beam, and wherein said force depending
6 on spring constants k_1, \dots, k_n , is only activated by the compression of said
7 deflecting beam against said at least one contact electrode.

9. A micro-electromechanical switch comprising:

at least one contact electrode;

a control electrode coplanar to said at least one contact electrode; and

a deflecting beam, said deflecting beam contacting said contact electrode, wherein a compressible elastically deformable means is affixed to a surface of either said deflecting beam or said at least one contact electrode.

10. The micro-electromechanical switch as recited in claim 9, wherein said deflecting beam is deflected by a voltage applied between said control electrode and said deflecting beam.

11. The micro-electromechanical switch as recited in claim 9, wherein said compressible elastically deformable means are discrete spring-like elements protruding from said at least one contact electrode or said deflecting beam.

12. A micro-electromechanical switch comprising :

at least one control electrode;

3 at least one switching electrode ,

4 a deflectable conductive beam anchored at one end and positioned
5 across a cavity surrounding said deflectable beam, wherein at least one
6 switching electrode is coated with at least one compressible, conductive layer
7 that is in electrical contact with said at least one switching electrode and
8 which is separated from said deflectable conductive beam by said cavity
9 when the micro-electromechanical switch is in an “off” state.

1 **13.** The micro-electromechanical switch as recited in claim 12, wherein
2 said deflectable conductive beam is deflected by a force toward said at least
3 one control electrode and said at least one switching electrode, said force
4 dependent on a spring constant k_0 is generated by a voltage applied
5 between said deflectable conductive beam and said at least one control
6 electrode, making contact with said compressible, conductive layer.

1 **14.** The micro-electromechanical switch as recited in claim 13 , wherein
2 said deflectable beam closes the micro-electromechanical switch and
3 compresses said compressible, conductive layer with a force dependent on an
4 added spring constant k_1 , said compression of said compressible, conductive
5 layer adding to a restorative force that restores the micro-electromechanical
6 switch to an open position when said voltage is removed.

1 **15. The micro-electromechanical switch as recited in claim 14, wherein**
2 **said compressible, conductive layer is positioned on a surface of said at least**
3 **one switching electrode, said compressible, conductive layer comprising**
4 **multiple stacked layers, with at least one of said multiple stacked layers**
5 **having a different spring constant.**